IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of	:	Sparks, Adrian
Serial No.	:	09/745,890
Filed	:	December 21, 2000
For	:	Load Sharing Nodes in a Network Utilising Shared Optical Protection
Examiner	:	Tran, Dzung D
Art Unit	:	2633
Customer number	:	23644
Confirmation No.	:	1275
Attorney Docket No.	:	920537-904862

BRIEF ON APPEAL

Honorable Director of Patents and Trademarks
PO Box 1450
Alexandria, VA 22313-1450

Dear Sir,

This is an appeal from the Examiner's Final Office Action of September 5, 2008 in which all pending claims, that is claims 1 to 8, were rejected. A timely Notice of Appeal is being e-filed concurrently herewith.

The brief fee of $540.00 pursuant to 37 C. F. R. §41.20(b) should be deducted from Deposit Account No. 12-0913.

(i) Real Party in Interest

This application is assigned to Nortel Networks Limited, who is the real party in interest.

(ii) Related Appeals and Interferences

There are no related appeals or interferences or judicial proceedings.

(iii) Status of Claims

This application was filed with claims 1 to 8.

Claims 1 to 8 have been finally rejected by the Examiner. The final rejection of these claims in the final office action of 5 September 2008 is appealed. Claims 1 to 8 as amended during the prosecution of the application, are set forth in the Claims Appendix.

(iv) Status of Amendments

No amendment or response has been made following final action issued on September 5, 2008.

(v) Summary of Invention

The present invention relates generally to optical communications systems. Such systems often have a protection scheme to reroute communications traffic in case of a failure somewhere along an original path, called the working path. As such schemes involve providing alternative paths, called protection paths, they reduce the bandwidth or capacity of the network. If protection paths were provided for every working path, this would halve the network capacity. Where the protection paths are rarely used, it is known to provide fewer protection paths, which are shared between the working paths.

It is known that the rerouting of traffic to the protection path can either be carried out by routers at nodes of the network, or for an individual link between nodes, a protection path and dedicated switches can be provided, without using the routers. This is typically much more expensive, but faster than using the routers. Another problem with routers is that rerouting means that each router table will require updating. This takes a finite time to be initiated and to propagate through

the network to routing tables at other nodes. Routing table updates are best avoided if possible. They consume router processing resources and can trigger routing instability or "route flapping".

The present invention addresses this problem, by using a link aggregated router having a first port for the working path and a second port for the shared protection path, both paths normally carrying link aggregated traffic. Link aggregation involves grouping physical link segments of the same media type and speed, and treating them as if they were part of a single, logical link segment (see line 24 of page 4 to line 21 of page 5 in particular). A link aggregation router is a load sharing device, so a failure in one or more of the physical links of the group of links, can be perceived by the router as a change in available bandwidth rather than a change in connectivity. The change in available bandwidth triggers a dynamic reassignment of the link aggregated traffic on the grouped links. Provided capacity is available on at least one link of the grouped links connected to either of the load sharing ports, the router will not see change in its connectivity. Thus, in this case, router tables need not be updated, and the problem condition of "route flapping" is inhibited from occurring.

Independent claim 1 specifies:

A network node (A,B,C,D in fig 3 and 4 and lines 22-27 of page 5) for an optical communications shared protection scheme network, the network node being arranged to provide optical signals to at least two transmission paths (212ab, 214ab, 212cd, 214cd in figs 3 and 4 and lines 22-27 of page 5), the node comprising a link aggregation router (210a, 210b, 210c, 210d in figs 3 and 4 and lines 22 of page 5 to line 9 of page 6, and lines 6-15 of page 5) having at least two ports (216a, 216b, 216c, 216d in figs 3 and 4 and lines 22-27 of page 5), a first port (216a, 216b, 216c, 216d in figs 3 and 4 and lines 22-27 of page 5) connected to a working transmission path (212ab, 212cd, in figs 3 and 4 and lines 22-27 of page 5), and a second port (216a, 216b, 216c, 216d and lines 22-27 of page 5) connected to a shared protection path (214ab, 214cd in figs 3 and

4 and lines 22-27 of page 5), such that in failure-free operation both the working transmission path and the shared protection path carry link aggregated traffic simultaneously without duplication of that traffic on the two routes (line 26 of page 5 to line 9 of page 6).

Independent claim 3 specifies:

An optical network (figs 3 or 4) comprising a plurality of network nodes (A,B,C,D in fig 3 and 4 and lines 22-27 of page 5), each network node being arranged to provide optical signals to at least two transmission paths (212ab, 214ab, 212cd, 214cd in figs 3 and 4 and lines 22-27 of page 5), the node comprising a link aggregation router (210a, 210b, 210c, 210d in figs 3 and 4 and lines 22 of page 5 to line 9 of page 6, and lines 6-15 of page 5) having at least two ports(216a, 216b, 216c, 216d in figs 3 and 4 and lines 22-27 of page 5), a first port connected to a working transmission path (212ab, 212cd, in figs 3 and 4 and lines 22-27 of page 5), and a second port (216a, 216b, 216c, 216d and lines 22-27 of page 5) connected to a shared protection path such that in failure-free operation both the working transmission path and the shared protection path carry link aggregated traffic simultaneously without duplication of that traffic on the two routes (line 26 of page 5 to line 9 of page 6).

Independent claim 4 specifies:

A method of transmitting packet traffic between first and second network nodes (A,B,C,D in fig 3 and 4 and lines 22-27 of page 5) in a shared protection optical transmission network (figs 3 or 4), the method comprising defining first and second traffic paths (212ab, 214ab, 212cd, 214cd in figs 3 and 4 and lines 22-27 of page 5) between said nodes, said first path being a shared protection path (214ab, 214cd in figs 3 and 4 and lines 22-27 of page 5), and said second path being a working transmission path (212ab, 212cd, in figs 3 and 4 and lines 22-27 of page 5), and allocating traffic along said paths utilising link aggregation (lines 22 of page 5 to line 9 of page 6, and lines 6-15 of page 5) such that in failure-free operation both the working transmission path and the shared protection path

carry link aggregated traffic simultaneously without duplication of that traffic on the two routes (line 26 of page 5 to line 9 of page 6).

(vi) Grounds of Rejection to be Reviewed on Appeal

There are two grounds of rejection:

1. Claims 1 to 6 have been rejected under 35 U.S.C. 102(a) as being unpatentable over Baroni et al. (US Patent No. 6,662,308) in view of Type and Characteristics of SDH Network Protections Architectures ITU-T, G.841 (10.98).

2. Claims 7 and 8 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Baroni et al. in view of Type and Characteristics of SDH Network Protections Architectures ITU-T, G.841 (10.98), and further in view of Shanklin et al. (US Patent No. 6,578,147).

(vii) Argument

Ground 1

The Examiner concedes that Baroni differs from claims 1, 3 and 4 in that Baroni does not disclose, in failure free operation, both the working transmission path and the shared protection path carrying link aggregated traffic simultaneously without duplication of that traffic on the two routes.

However, the Applicant further asserts that Baroni does not disclose a network node comprising a link aggregation router.

Baroni only presents the use of routers to send data over a network to routers located in other parts of the network. When explaining unshared protection architectures, Baroni details the more simple process of switching traffic between paths. This can only be considered to be relevant to claim 1 if the switching routers of Baroni can be seen as link aggregation routers and if both primary and secondary paths carry link aggregated traffic.

In the September 5, 2008 final office action, the Examiner has argued that the definition of link aggregation is not set out in the claims. This definition is set out explicitly in the specification, and it is well established in case law that the broadest reasonable interpretation of the claims cannot be inconsistent with such an explicit definition in the specification. Thus, a point of disagreement seems to be whether this definition can be ignored when interpreting the claims.

Link aggregation is a well known term which is defined in the specification as follows:

> "Link aggregation is a method of grouping physical link segments of the same media type and speed, and treating them as if they were part of a single, logical link segment." (page 5, line 6)

This definition continues with the explanation that:

> "If a link in a trunk fails, the flows mapped to that link are dynamically reassigned to the remaining links of the aggregated link." (page 5, line 12)

The Examiner has acknowledged that the broadest reasonable interpretation of the claim cannot ignore such an explicit definition in the specification. The definition follows the established use of the phrase and so merely reinforces the interpretation that a skilled person would use, anyway.

There is no mention by Baroni et al that the routers in the architecture of Figures 1-3 are anything more than traffic switchers. The shared protection path in Baroni does involve the reallocation of traffic in the event of a failure, but this reallocation does not meet the definition of link aggregation which is "reallocation to the remaining links of the aggregated link". In Baroni, the reallocation is not to the remaining links, but is to an alternative line, the secondary line.

The Examiner looks to "Type and Characteristics of SDH Network Protection Architectures ITU-T, G.841 (10/98)" (hereinafter referred to as D2) for the disclosure of simultaneous transmission of aggregated traffic on both the

transmission path and shared protection path during failure-free operation. It is respectfully submitted that the disclosure of having protection channels carry extra traffic when not being used for protection of normal traffic does not teach the features of claims 1, 3 and 4 which are missing from Baroni.

D2 does not disclose link aggregated traffic being carried on both the working path and the shared protection path, during failure-free operation. Starting from Baroni, and considering savings in protection capacity that shared protection architectures can provide (see col.2, lines 46-56), the skilled person is taught that unused protection channels can be shared for failure affecting other transmission paths, thus improving network capacity. D2 only states that extra traffic can be carried on a protection channel, and does not discuss exactly what is carried on the shared protection path during failure-free operation.

In view of Baroni's disclosure, the teaching of D2 can only be said to lead a reader to understanding that an un-used protection channel can provide additional capacity for additional traffic. This additional traffic cannot be taken as link aggregated traffic as defined above. Such link aggregated traffic comprises flows which are mapped to a group of physical link segments of the same media type and speed, treated as if they were part of a single, logical link segment, and dynamically reassigned between the links in the event of failure.

Given the explanation above of link aggregation and Baroni's disclosure being limited to traffic switching between primary and secondary paths, it should be apparent that these subject-matter of claims 1, 3 and 4 goes beyond any combination of Baroni and D2.

As explained in previous responses, and as seen in Baroni, optical protection schemes would normally be handled at the link level and thus operate independently of any link aggregation router. Hence there is nothing in either Baroni or D2 which leads the person skilled in the art towards the unconventional step of incorporating a link aggregation router into an optical shared protection

scheme as set out in present claim 1. Nor is there any disclosure of transmitting link aggregated traffic of an unused protection channel.

The claimed invention makes more efficient use of available bandwidth. The advantages of link aggregation and of shared protection paths can be achieved simultaneously and more efficiently by using the same router for both schemes. There is no suggestion in Baroni or D2 of this concept, nor any suggestion of using a router to separate traffic between a shared protection path and a working path.

All the other claims have corresponding features or are dependent on such claims, and so these arguments apply to all claims. Thus, the first ground of rejection should be reversed.

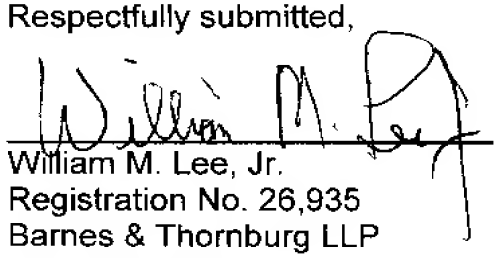
Ground 2

For the reasons set forth above, the second ground of rejection is equally incorrect, and should be reversed.

Reference is also made to arguments in previous responses. Reversal of the Examiner's rejections is respectfully requested.

November 13, 2008

Respectfully submitted,



William M. Lee, Jr.
Registration No. 26,935
Barnes & Thornburg LLP
P.O. Box 2786
Chicago, Illinois 60690-2786
(312) 214-4800
(312) 759-5646 (fax)

Claims Appendix

1. A network node for an optical communications shared protection scheme network, the network node being arranged to provide optical signals to at least two transmission paths, the node comprising a link aggregation router having at least two ports, a first port connected to a working transmission path, and a second port connected to a shared protection path, such that in failure-free operation both the working transmission path and the shared protection path carry link aggregated traffic simultaneously without duplication of that traffic on the two routes.

2. A network node as claimed in claim 1, wherein said shared protection path is a ring, said second port being connected to said ring via an optical switching device arranged to switch signals transmitted to and from the second port in either direction around the ring.

3. An optical network comprising a plurality of network nodes, each network node being arranged to provide optical signals to at least two transmission paths, the node comprising a link aggregation router having at least two ports, a first port connected to a working transmission path, and a second port connected to a shared protection path such that in failure-free operation both the working transmission path and the shared protection path carry link aggregated traffic simultaneously without duplication of that traffic on the two routes.

4. A method of transmitting packet traffic between first and second network nodes in a shared protection optical transmission network, the method comprising defining first and second traffic paths between said nodes, said first path being a shared protection path, and said second path being a working transmission path, and allocating traffic along said paths utilising link aggregation such that in failure-free operation both the working transmission path and the

shared protection path carry link aggregated traffic simultaneously without duplication of that traffic on the two routes.

5. A method as claimed in claim 4, wherein said shared protection scheme is an optical shared protection ring, and wherein in the event of a failure or degradation of said protection path, the protect path is switched to be the other way around the ring.

6. A method as claimed in claim 4, wherein a failure in a transmission path is perceived by the nodes as a reduction in capacity by said nodes.

7. A computer program arranged to control the transmission of packet traffic in accordance with the method of claim 4.

8. A computer program as claimed in claim 7, the program being stored on a machine readable medium.

Evidence Appendix

None.

Related Proceedings Appendix

None.